

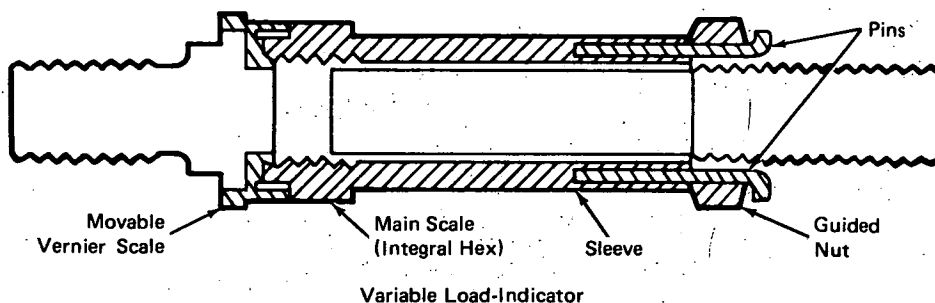
NASA TECH BRIEF

Marshall Space Flight Center



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Variable Load Indicator



A new weighing device was developed for measuring loads as a function of its elongation. The device is compact, simple, and inexpensive. It does not require presetting and will measure any load from zero to its yield point. Because of its low cost relative to other load indicators such as strain gauges, the device can be used as a turnbuckle for tensioning straps, rods, or cables where accurate preloading is critical.

The device stretching, due to load, is measured by the amount of rotation in a threaded sleeve (see figure). Since a single thread gives little rotation and large displacement for typically small loads, a differential thread mechanism is employed to give large rotation (sleeve rotation) for little displacement, on the order of six or more times. This provides more accuracy in reading the scales. A scribed line on the sleeve indicates preload when aligned with a line on the integral hex. The design allows a 500-pound (227-kg) load to be obtained at 60° rotation with $\pm 10\%$ maximum error.

During measurement, the load produces a gap between the sleeve and a guided nut which rotates with the sleeve but allows the gap to open or close. Since the sleeve and nut threads are of different pitch, they travel at slightly different speeds. The sleeve moves faster and will overtake the nut, thus closing the gap. Gap closure brings rotation to a halt. The direction and amount of subsequent load change are obtained by comparing new readings relative to previous readings.

Notes:

1. Information concerning this device may be of interest to manufacturers and users of load cells and turnbuckles, as well as to laboratories working with structural analyses. The device, in addition, may also be used for safety checks in construction.
2. Requests for further information may be directed to:
Technology Utilization Officer
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Reference: B73-10335

Patent status:

Inquiries concerning rights for the commercial use of this invention should be addressed to:

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